E/ECE/324
E/ECE/TRANS/505 } Add.2/Rev.2/Amend.1

11 August 1998

AGREEMENT

CONCERNING THE ADOPTION OF UNIFORM TECHNICAL PRESCRIPTIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES AND THE CONDITIONS FOR RECIPROCAL RECOGNITION OF APPROVALS GRANTED ON THE BASIS OF THESE PRESCRIPTIONS */

(Revision 2, including the amendments entered into force on 16 October 1995)

Addendum 2: Regulation No. 3

Revision 2 - Amendment 1

Incorporating:
Supplement 4 to the 02 series of amendments - Date of entry into force: 18 January 1998
Supplement 5 to the 02 series of amendments - Date of entry into force: 5 June 1998

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF RETRO-REFLECTING DEVICES FOR POWER-DRIVEN VEHICLES AND THEIR TRAILERS

UNITED NATIONS

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*/ Former title of the Agreement:

Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

GE.98- 22190

Contents, "Annexes",

Title of annex 1, amend to read:

"Annex 1 Retro-reflecting devices, symbols, units"

Insert three new titles, to read:

"Annex 16 Test procedure for Class IB devices

Annex 17 - Minimum requirements for conformity of production control procedures

Annex 18 - Minimum requirements for sampling by an inspector"

Text of the Regulation,

Paragraph 2.15., amend to read:

"2.15. Retro-reflecting devices are divided into three classes according to their photometric characteristics: Class IA or IB, Class IIIA and Class IVA."

Insert a new paragraph 2.16., to read:

"2.16. Retro-reflecting devices of Class IB are devices combined with other signal lamps which are not watertight according to annex 8, paragraph 1.1., and which are integrated into the body of a vehicle."

Paragraph 3.1.3., amend to read:

"3.1.3. Samples of the retro-reflecting device of a colour specified by the manufacturer and, if necessary, the means of fixation; the number of samples to be submitted is specified in annex 4."

Paragraph 5.5.1.1., footnote 3/, amend to read:

"3/ .... 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32-36 (vacant), 37 for Turkey, 38-39 (vacant) and 40 for The former Yugoslav Republic of Macedonia. Subsequent numbers .... to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, ..."

Paragraph 5.5.1.3., amend to read:

"5.5.1.3. a group of symbols IA, IB, IIIA or IVA showing the class of the approved retro-reflecting device."

Insert new paragraph 6.6., to read:

"6.6. There shall be no access to the inner surface of the retro-reflectors when in normal use."

Paragraph 7.1., amend to read:

".....The test procedures are described in annex 4 (Class IA, IIIA), annex 14 (Class IVA) and annex 16 (Class IB)."

Paragraph 8, replace by the following text:

"8. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2), with the following requirements:

8.1. Retro-reflectors approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6 and 7 above.

8.2. The minimum requirements for conformity of production control procedures set forth in annex 17 to this Regulation shall be complied with.

8.3. The minimum requirements for sampling by an inspector set forth in annex 18 to this Regulation shall be complied with.

8.4. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years."

Annex 3,

The note, amend to read:

"..... The competent authorities shall avoid using approval numbers IA, IB, IIIA and IVA which might be confused with the class symbols IA, IB, IIIA and IVA.

These sketches ....."

Annex 4,

Paragraph 2, amend to read:

".....
First Group: The two samples shall be subjected successively to the water penetration test (Annex 8, paragraph 1.1.) and ....."

Annex 5,

Paragraph 1, amend to read:

"1. SHAPE AND DIMENSIONS OF RETRO-REFLECTING DEVICES IN CLASS IA OR IB"

Annex 7,

Paragraph 2., amend to read:

"2. For photometric measurements only the illuminating surface contained within a circle of 200 mm diameter for Class IA or IB shall be considered, ..."

Paragraph 3.1., amend to read:

"3.1. Class IA, Class IB and Class IIIA"

Paragraph 3.1.1., the table, in the column "Class" on the second line, amend the entry "IA" to read "IA, IB".

Paragraphs 3.1.2. and 3.1.3., amend the words "class IA" to read "class IA or IB" (twice).

Annex 8, paragraphs 1. to 1.3., replace by the following text:

"Annex 8

RESISTANCE TO EXTERNAL AGENTS

1. Resistance to water and dirt penetration

1.1. Water submersion test

1.1.1. Retro-reflecting devices whether part of a lamp or not, shall be stripped of all removable parts and immersed for 10 minutes in water at a temperature of 50° ± 5°C, the highest point of the upper part of the illuminating surface being 20 mm below the surface of the water. This test shall be repeated after turning the retro-reflecting device through 180°, so that the illuminating surface is at the bottom and the rear face is covered by about 20 mm of water. These optical units shall then be immediately immersed in the same conditions in water at a temperature of 25° ± 5°C.

1.1.2. No water shall penetrate to the reflecting surface of the retro-reflecting optical unit. If visual inspection clearly reveals the presence of water, the device shall not be considered to have passed the test.

1.1.3. If visual inspection does not reveal the presence of water or in case of doubt, the CIL shall be measured by the method described in annex 4, paragraph 3.2., or annex 14, paragraph 4.2., the retro-reflecting device being first lightly shaken to remove excess water from the outside.

1.2. Alternative test procedure for Class IB devices

As an alternative, at the request of the manufacturer, the following test (moisture and dust test) shall be applied instead of the submersion-test specified in paragraph 1.1. above.

1.2.1. Moisture test

The test evaluates the ability of the sample device to resist moisture penetration from a water spray and determines the drainage capability of those devices with drain holes or other exposed openings in the device.

1.2.1.1. Water spray test equipment

A water spray cabinet with the following characteristics shall be used:

1.2.1.1.1. Cabinet

The cabinet shall be equipped with a nozzle(s) which provides a solid cone water spray of sufficient angle to completely cover the sample device. The centreline of the nozzle(s) shall be directed downward at an angle of 45° ± 5° to the vertical axis of a rotating test platform.

1.2.1.1.2. Rotating test platform

The rotating test platform shall have a minimum diameter of 140 mm and rotate about a vertical axis in the centre of the cabinet.

1.2.1.1.3. Precipitation rate

The precipitation rate of the water spray at the device shall be 2.5 (+ 1.6/-0) mm/min as measured with a vertical cylindrical collector centred on the vertical axis of the rotating test platform. The height of the collector shall be 100 mm and the inside diameter shall be a minimum of 140 mm.

1.2.1.2. Water spray test procedure

A sample device mounted on a test fixture, with initial CIL measured and recorded shall be subjected to a water spray as follows:

1.2.1.2.1. Device openings

All drain holes and other openings shall remain open. Drain wicks, when used, shall be tested in the device.

1.2.1.2.2. Rotational speed

The device shall be rotated about its vertical axis at a rate of 4.0 ± 0.5 min $^{-1}$.

1.2.1.2.3. If the retro-reflector is reciprocally incorporated with signalling or lighting functions, these functions shall be operated at design voltage according to a cycle of 5 min ON (in flashing mode, where appropriate), 55 min OFF.

1.2.1.2.4. Test duration

The water spray test shall last 12h (12 cycles of 5/55 min).

1.2.1.2.5. Drain period

The rotation and the water spray shall be turned OFF and the device allowed to drain for 1 h with the cabinet door closed.

1.2.1.2.6. Sample evaluation

Upon completion of the drain period. The interior of the device shall be observed for moisture accumulation. No standing pool of water shall be allowed to be formed, or which can be formed by tapping or tilting the device. The CIL shall be measured according to the method specified in annex 4 paragraph 3.2. after having dried the exterior of the device with a dry cotton cloth.

1.2.2. Dust exposure test

This test evaluates the ability of the sample device to resist dust penetration which could significantly affect the photometric output of the retro-reflector.

1.2.2.1. Dust exposure test equipment

The following equipment shall be used to test for dust exposure:

1.2.2.1.1. Dust exposure test chamber

The interior of the test chamber shall be cubical in shape in size 0.9 to 1.5 m per side. The bottom may be "hopper shaped" to aid in collecting the dust. The internal chamber volume, not including a "hopper shaped" bottom shall be 2 m^3 maximum and shall be charged with 3 to 5 kg of the test dust. The chamber shall

have the capability of agitating the test dust by means of compressed air or blower fans in such a way that the dust is diffused throughout the chamber.

1.2.2.1.2. The dust

The test dust used shall be fine powdered cement in accordance with standard ASTM C 150-84. */

1.2.2.2. Dust exposure test procedure

A sample device, mounted on a test fixture, with the initial CIL measured and recorded, shall be exposed to dust as follows:

1.2.2.2.1. Device openings

All drain holes and other openings shall remain open. Drain wicks, when used, shall be tested in the device.

1.2.2.2.2. Dust exposure

The mounted device shall be placed in the dust chamber no closer than 150 mm from a wall. Devices with a length exceeding 600 mm shall be horizontally centred in the test chamber. The test dust shall be agitated as completely as possible by compressed air or blower(s) at intervals of 15 min for a period of 2 to 15 s for the duration of 5 hours. The dust shall be allowed to settle between the agitation periods.

1.2.2.2.3. Measured sample evaluation

Upon completion of the dust exposure test, the exterior of the device shall be cleaned and dried with a dry cotton cloth and the CIL measured according to the method specified in annex 4, paragraph 3.2."

Add new Annexes 16, 17 and 18, to read:

"Annex 16

TEST PROCEDURE FOR CLASS IB DEVICES

Retro-reflecting devices of Class IB shall be tested according to the test procedures specified in annex 4, following the chronological order of tests given in annex 12, with the exception of the test according to annex 8, paragraph 1, which for Class IB devices may be replaced by the test specified in annex 8, paragraph 1.2.

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*/ American Society for Testing and Materials

Annex 17

MINIMUM REQUIREMENTS FOR CONFORMITY OF PRODUCTION CONTROL PROCEDURES

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.

1.2. With respect to photometric performances, the conformity of mass-produced retro-reflectors shall not be contested if, when testing photometric performances of any retro-reflector chosen at random no measured value deviates unfavourably by more than 20 per cent from the minium values prescribed in this Regulation.

1.3. The chromaticity coordinates shall be complied with.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of retro-reflector the holder of the approval mark shall carry out at least the following tests, at appropriate intervals. The tests shall be carried out in accordance with the provisions of this Regulation.

If any sampling shows non-conformity with regard to the type of test concerned, further samples shall be taken and tested. The manufacturer shall take steps to ensure the conformity of the production concerned.

2.1. Nature of tests

Tests of conformity in this Regulation shall cover the photometric and colorimetric characteristics and the resistance to penetration of water.

2.2. Methods used in tests

2.2.1. Tests shall generally be carried out in accordance with the methods set out in this Regulation.

2.2.2. In any test of conformity carried out by the manufacturer, equivalent methods may be used with the consent of the competent authority responsible for approval tests. The manufacturer is responsible for proving that the applied methods are equivalent to those laid down in this Regulation.

2.2.3. The application of paragraphs 2.2.1. and 2.2.2. requires regular calibration of test apparatus and its correlation with measurements made by a competent authority.

2.2.4. In all cases the reference methods shall be those of this Regulation, particularly for the purpose of administrative verification and sampling.

2.3. Nature of sampling

Samples of retro-reflectors shall be selected at random from the production of a uniform batch. A uniform batch means a set of retro-reflectors of the same type, defined according to the production methods of the manufacturer.

The assessment shall in general cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories, provided these operate under the same quality system and quality management.

2.4. Measured and recorded photometric characteristics

The sampled retro-reflector shall be subjected to photometric measurements at the points and the chromaticity coordinates provided for in the Regulation.

2.5. Criteria governing acceptability

The manufacturer is responsible for carrying out a statistical study of the test results and for defining, in agreement with the competent authority, criteria governing the acceptability of his products in order to meet the specifications laid down for the verification of conformity of products in paragraph 8.1. of this Regulation.

The criteria governing the acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing a spot check in accordance with annex 18 (first sampling) would be 0.95.

Annex 18

MINIMUM REQUIREMENTS FOR SAMPLING BY AN INSPECTOR

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.

1.2. With respect to photometric performance, the conformity of mass-produced retro-reflectors shall not be contested if, when testing photometric performances of any retro-reflector chosen at random:

1.2.1. no measured value deviates unfavourably by more than 20 per cent from the minimum values prescribed in this Regulation.

1.2.2. Retro-reflectors with apparent defects are disregarded.

1.3. The chromaticity coordinates shall be complied with.

2. FIRST SAMPLING

In the first sampling four retro-reflectors are selected at random. The first sample of two is marked A, the second sample of two is marked B.

2.1. <u>The conformity is not contested</u>

2.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced retro-reflectors shall not be contested if the deviation of the measured values of the retro-reflectors in the unfavourable directions are:

2.1.1.1. sample A

A1:	one retro-reflector	0 per cent
	one retro-reflector not more than	20 per cent
A2:	both retro-reflectors more than	0 per cent
	but not more than	20 per cent
	go to sample B	

2.1.1.2. sample B

B1:	both retro-reflectors	0 per cent

2.2. <u>The conformity is contested</u>

2.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced retro-reflectors shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the retro-reflectors are:

2.2.1.1. sample A

A3:	one retro-reflector not more than	20 per cent
	one retro-reflector more than	20 per cent
	but not more than	30 per cent

2.2.1.2. sample B

B2:	in the case of A2	
	one retro-reflector more than	0 per cent
	but not more than	20 per cent
	one retro-reflector not more than	20 per cent
B3:	in the case of A2	
	one retro-reflector	0 per cent
	one retro-reflector more than	20 per cent
	but not more than	30 per cent

2.3. Approval withdrawn

Conformity shall be contested and paragraph 9 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the retro-reflectors are:

2.3.1. sample A

A4:	one retro-reflector not more than	20 per cent
	one retro-reflector more than	30 per cent
A5:	both retro-reflectors more than	20 per cent

2.3.2. sample B

B4:	in the case of A2	
	one retro-reflector more than	0 per cent
	but not more than	20 per cent
	one retro-reflector more than	20 per cent
B5:	in the case of A2	
	both retro-reflectors more than	20 per cent
B6:	in the case of A2	
	one retro-reflector	0 per cent
	one retro-reflector more than	30 per cent

3. REPEATED SAMPLING

In the cases of A3, B2, B3 a repeated sampling, third sample C of two retro-reflectors and fourth sample D of two retro-reflectors, selected from stock manufactured after alignment, is necessary within two months' time after the notification.

3.1. The conformity is not contested

3.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced retro-reflectors shall not be contested if the deviations of the measured values of the retro-reflectors are:

3.1.1.1. sample C

C1:	one retro-reflector	0 per cent
	one retro-reflector not more than	20 per cent
C2:	both retro-reflectors more than	0 per cent
	but not more than	20 per cent
	go to sample D	

3.1.1.2. sample D

D1:	in the case of C2	
	both retro-reflectors	0 per cent

3.2. The conformity is contested

3.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced retro-reflectors shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the retro-reflectors are:

3.2.1.1. sample D

D2:	in the case of C2	
	one retro-reflector more than	0 per cent
	but not more than	20 per cent
	one retro-reflector not more than	20 per cent

3.3. Approval withdrawn

Conformity shall be contested and paragraph 9 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the retro-reflectors are:

3.3.1. sample C

C3:	one retro-reflector not more than	20 per cent
	one retro-reflector more than	20 per cent
C4:	both retro-reflectors more than	20 per cent

3.3.2. sample D

D3:	in the case of C2	
	one retro-reflector 0 or more than	0 per cent
	one retro-reflector more than	20 per cent

4. RESISTANCE TO PENETRATION OF WATER

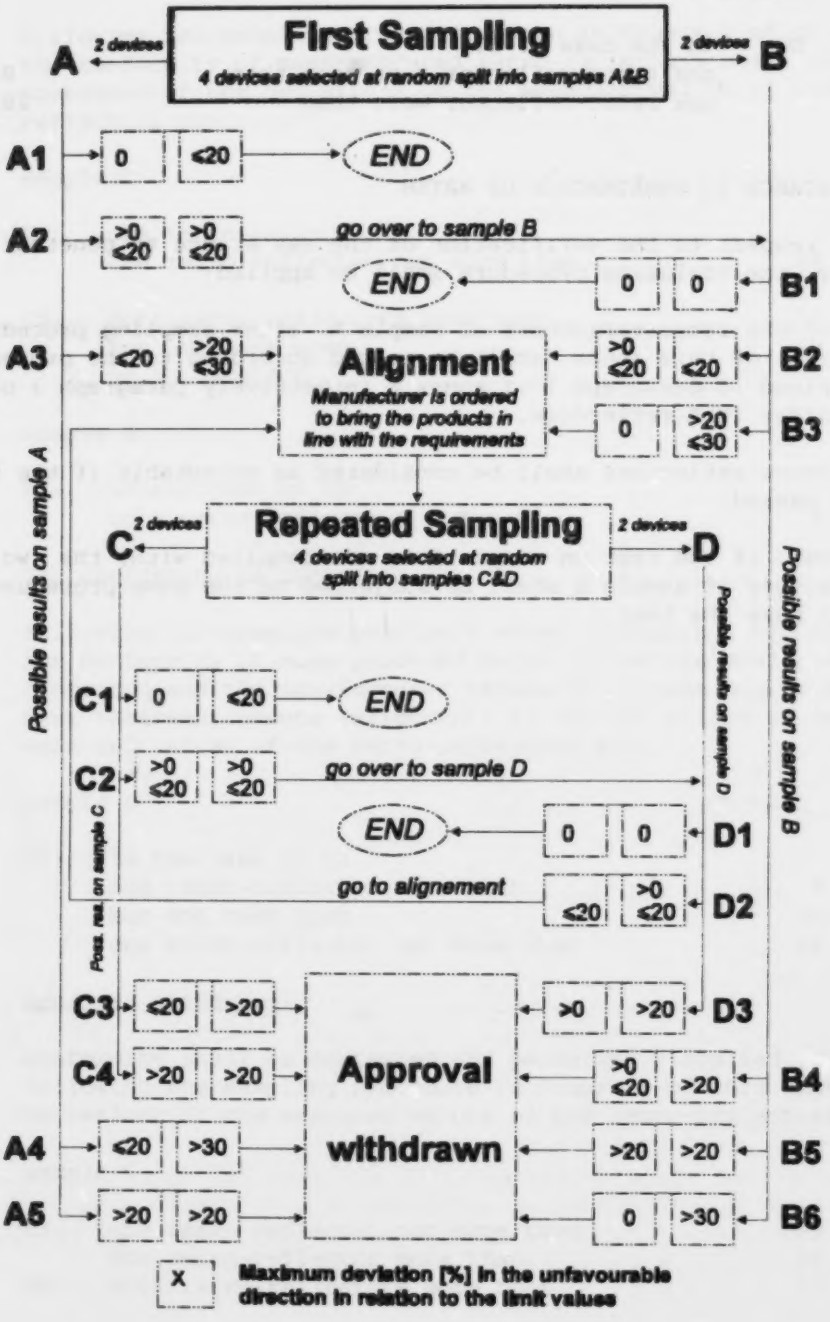
With respect to the verification of the resistance to penetration of water, the following procedure shall be applied:

One of the retro-reflectors of sample A, after sampling procedure in Figure 1 of this annex, shall be tested according to the procedure described in paragraph 1 of annex 8 respectively paragraph 3 of annex 14 for class IV A reflectors.

The retro-reflectors shall be considered as acceptable if the test has been passed.

However, if the test on sample A is not complied with, the two retro-reflectors of sample B shall be subjected to the same procedure and both shall pass the test.

Figure 1


First Sampling
4 devices selected at random split into samples A&B
2 devices
A
2 devices
B
A1
0
≤20
END
A2
>0 ≤20
>0 ≤20
go over to sample B
END
0
0
B1
A3
≤20
>20 ≤30
Alignment
Manufacturer is ordered to bring the products in line with the requirements
>0 ≤20
≤20
B2
0
>20 ≤30
B3
Repeated Sampling
4 devices selected at random split into samples C&D
C
D
Possible results on sample A
Possible results on sample B
Possible results on sample D
Poss. res. on sample C
C1
C2
go over to sample D
D1
go to alignement
D2
C3
>20
Approval withdrawn
>0
D3
C4
B4
A4
>30
B5
A5
B6
X
Maximum deviation [%] in the unfavourable direction in relation to the limit values

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